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ASSESSING COSTS OF EXTENSIONS IN A MUNICIPALLY OWNED PLANT

By D. A. REED¹

It has been generally conceded that certain civic improvements or conveniences constructed or furnished by a municipality may not be wholly paid for by general taxation, but may be assessed as special benefits against abutting property. This assessment may cover the costs in whole, or in part, but the principle is recognized that a local improvement of any nature must of necessity carry with it some direct benefit to the abutting property. It is also true that no improvement can be made without some benefit to the municipality at large. With improvements of this nature we may properly class sewers, street improvements of all kinds, water works, gas plants, and possibly other utilities.

An improvement of any kind which is largely local in nature, that is, which from the nature of its construction is largely an accommodation to the abutting property only, is found in lateral sewers and water mains of minimum capacities supplying or serving local properties only, and which do not provide capacities in excess of local requirements, and which are not indispensable for serving more distant territory.

Street improvements, including pavements, curbs, gutters and culverts, trunk sewers and the larger sizes of mains in the distribution of a water or gas supply, serve to accommodate a less restricted area and cannot be considered as strictly local in their nature. A pavement for instance, on one street alone, might well be considered as a benefit to some extent of all the property within the city limits or even outside of the city limits, although its greatest benefit would be to the property adjacent, a sewer, however, might be entirely local so far as its benefits are concerned and be of no value whatever to any other property.

The logical method for assessing the cost of any improvement, the product of any utility, or the benefits from any service rendered, is

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upon the interests directly benefited. In private business where one interest often benefits largely from the enterprise of another, there is no practicable method of applying this rule unless they are customers or purchasers of the products of that utility, and even then the costs are often disproportionate to the service rendered on account of the escape of such interests from the contribution as do not purchase directly the products of that enterprise.

A city owned utility usually has the power to assess certain benefits, whether the party interested chooses to be a consumer or not. Applying this fact to sewers and water mains the proper method would be to assess the costs of construction, or in other words, the capital investment, against the property that it is possible to serve. The costs of operation, however, should be levied against the parties purchasing the output or using the service.

Sewers, after they have been constructed and the costs having been met by all the property owners served, regardless of whether they are connected or not, should be operated at the expense of those only who use or are connected with it. The operating costs, however, are relatively small and are not usually assessed but are paid out of the general fund supported by general taxation. In a street improvement it would be manifestly impracticable to assess costs of operation against those served or who use the utility; in a manner, however, this is accomplished by means of a wheelage tax, the receipts of which are applied to operating expenses.

In the case of a municipal water supply, these matters seem to be much easier of solution and it seems quite practicable to assess costs of construction directly upon the property susceptible of being served, and to assess the operating costs directly upon the customers or patrons of the utility, in proportion to the quantity of water consumed. This condition it must be observed is not met entirely by a rate charged upon a demand and output basis such as is in effect in New Orleans, for the reason that the demand charge does not extend to vacant property.

To those who believe that vacant property should not escape taxation for any improvement that directly enhances its value, this fact will appeal. It would also seem to be a fair check or restraint upon interests that invest in idle property with a view of gain which results largely from the activities of others and in which its existence directly increases the cost of every utility that passes the premises.

It is assumed that a municipal water plant should be self-sustain-

ing in every sense of the word. It should neither give nor receive any benefit or consideration of any kind from the taxpayer, the city or the individual.

A water main in which the size is in excess of the minimum may be classified as serving two purposes, the service to the property directly abutting and the service to properties located more distantly from the source of supply. In the first instance, for the purpose of this discussion, a 6-inch service may be considered as sufficient, and for all sizes in excess of 6 inches, for the additional service to those more distant. Assessments against abutting property for the 6-inch main are easily applied. For costs of mains in excess of this size the only practicable way appears to consider the additional cost as a part of the general distribution system, the expense of which has to be absorbed by the utility and included in the consumers' rates chargeable as operating costs. The direct assessment to the abutting property for the 6-inch main, this size being used as a matter of convenience, may be assessed against the abutting property by means of either of two methods. First, in the total, on the completion of the work, which is paid by one assessment. Second, the principal being furnished from the funds of the utility a percentage may be assessed annually against the property to cover interest and sinking fund upon the investment. After a term of years the percentage assessment will have returned enough money to the utility to cover the principal as well as interest upon the investment. Ordinarily the vacant property thus assessed should continue to pay the assessment for the full term of years necessary to wipe out the original costs. Improved property, using water and paying for it upon meter rates would be entitled to some credit or rebate on account of these rates, especially if the rates are based upon capital investment expense as well as operating costs upon the entire plant. Assuming for the purpose of illustration that one-half of the water rates are to cover interest and sinking fund expense, and that the balance is to cover operating costs including depreciation, it will be found necessary to credit one-half of the customer's water rates against his assessment. This credit will ordinarily retire the annual percentage assessment upon improved property, unless the cost of constructing the extension was large and the consumer's consumption was low. If his consumption is considerably more than necessary to wipe out his individual assessment, the surplus, of course, should be applied pro rata to lessen the tax upon the vacant prop-

erty. It is quite possible for the consumption on an extension to increase to such an extent that the overplus of credits will be sufficient to retire all the assessment against the vacant property upon that particular extension, in which case, having reached that point, all assessments should be discontinued as the customers are carrying the entire expense of the extension, including capital investment as well as operating costs. This even may be accomplished at the end of one year or two years or possibly ten or fifteen years, depending upon the rate of the percentage assessment against the property, the interest and sinking fund factor in the rates charged for the water, and the amount of the consumption upon the extension.

It is also quite possible an extension may be made where there is no consumption for the first year. In this case all the property pays the percentage assessment with no credits and the utility receives the exact amount necessary to pay interest and sinking fund charges.

The method employed at Duluth, Minnesota, in which a gas utility is also operated in connection with the water system, the pipes being laid in the same trench, has been to assess annually against the abutting property, 8 per cent of the total cost of each extension as represented by a 4-inch gas and a 6-inch water main, it having been established that sizes in excess of these dimensions would be more or less of a general benefit to all customers and property and for the strengthening of the system to benefit other customers outside of those served by that particular extension. The proportion of charges against the abutting property has been based upon 5 per cent for interest and 3 per cent for sinking fund assessed annually for a period of fifteen years, 3 per cent contribution to a 4 per cent sinking fund however will not retire the principal short of 22 years, but for various reasons it has been considered advisable to limit the duration of annual assessments to a fifteen-year term. A special discount of 25 per cent is allowed to those paying the total amount in one payment. These assessments are made according to the frontage of the lot, without reference to its depth. However, the frontage of the lot is not considered necessarily as being the side abutting the street upon which the extension is made. It may lie parallel to the mains and front on another street. It is assessed the same as other lots of the same frontage dimension. Subsequently if mains are laid in front of the short side no assessment is made therefor on this particular lot, which can of course, receive no benefit from a second extension. Against this assessment is credited one-half of the water

and one-third of the gas rates paid by the occupant of the premises, it being estimated that these proportions are necessary factors in a rate that will yield the proper amount of revenues for maintaining and operating the plant.

The principles and results involved in the methods as outlined above seem to be as follows:

1. All charges whether of installation or of operation against property or a customer are based upon actual cost.
2. Costs of distributing systems are ordinarily borne by abutting property except when the consumption is sufficiently large to assume the whole or part of this expense when the charge is gradually transferred to the customer.
3. The customer bears operating costs and such installation charges as cover reservoirs, pumping machinery, stations, intakes and the larger distributing mains.
4. As the municipal plant increases in size and in the amount of its revenues, its percentage of indebtedness will gradually decrease, the proportion of interest and sinking fund in the rates charged for water will decrease until eventually, when no indebtedness exists, this factor will become zero and there will be no credits against the assessments. They will have to be met in full cash payments or the consumer may discount the entire amount of his individual assessment by paying cash, taking advantage of the 25 per cent discount.
5. The percentage plan enables the small property owner who is a consumer to obtain extensions on very easy terms, with practically no additional expense over and above the regular water rates.
6. It seems to be a practicable way for real estate owners to secure extensions of gas and water service in newly platted additions without throwing any of the burden upon the utility or its customers.
7. It furnishes a profitable investment at 8 per cent net for the sinking funds of the department until the time arrives when it will be needed to retire bonds, at which time, if the money or any portion of it cannot be withdrawn, refunding bonds or new bonds in whole or in part may be issued. Eventually, if the rates for service have been correctly established, the time will be reached when its entire indebtedness will be retired. This will be true if depreciation and maintenance have been provided for in the operating expenses as well as interest and sinking fund on the indebtedness.

DISCUSSION

MR. WIRT J. WILLS: The speaker does not suppose there can be any absolute rules for these kinds of extensions and probably it might be well for some of us to tell how it is done in our own towns.

In Memphis, Tennessee, a municipally owned plant, the water board, laid one hundred foot extensions to the houses. Should a subdivision be opened up without any houses on it, the owners of the subdivision have to take advantage of what we call the "water-note plan," which is a note made up like any other note only it says, "payable in rentals from water without interest so many dollars;" for instance, the man that gives this note advances the money and all of the revenues out of that line are credited up to him until all the money that the main cost has been returned to him. In that way probably 40 per cent of the resident district of Memphis has had mains put in and a great many of them are already paid for. Some of them are not quite paid up yet. Of course when it comes under construction the man that advances the money takes all the burden of the scheme. If we put down a main for a man for a subdivision and it is not developed properly and is perhaps sold for a brick-yard, all the burden then comes on him if it is not a success.

MR. JOHN M. DIVEN: Does that apply only to new development, or to all extensions?

MR. WIRT J. WILLS: You know that Memphis is about all extended except newly annexed territory out in different places. One street was opened up by one of the water commissioners, in the heart of the residence section, and he had to put up fourteen hundred and sixty dollars just the same as if he had been any other man; but, except in new territory, there is very little in the suburbs that is not annexed. We find it comparatively satisfactory, people get their money entirely back and it is satisfactory to us.

MR. J. M. DIVEN: That money comes out of the revenue; it is never capitalized?

MR. WIRT J. WILLS: It is simply treated as an advancement of the money, or bills payable.

MR. J. M. DIVEN: It does not appear in your capital account?

MR. WIRT J. WILLS: The money advanced is credited to a separate account known as "water note account" (or bills payable). The main laid is charged to construction the same as all other mains laid are charged.

Twice a year the amount paid for the use of water from said main is returned to the party who advanced it, and charged to "water note account." This money is paid out of a fund derived from the sale of bonds, the same as all construction is.

However, the legal advice on the subject is, in this state, when a water company or municipality makes enough money to pay its interest, to create a sinking fund, pay all its expenses, and the price of water is equitable, any other moneys earned "can be used for construction if necessary."

In this scheme, the man who wants the main at once, simply advances the money without interest, and it is returned to him according to the main's earning capacity.

MR. JOHN M. DIVEN: If all of your construction and extensions were provided for in that way you would have no capital account for the distribution system, and no interest on that part of the construction would appear in the operation cost of the works.

MR. ALEXANDER MILNE: The suggestion of the Secretary is perhaps comparable to the method adopted by a careful individual as to his own house and lot. A municipally owned water works is simply a collective individual interest and if it were necessary to expend any sum within the ability of the finances for renewals or extensions, and it could be done from "savings" from revenue account without further bonding or mortgaging the "collective" property, the effect would be equally good financing as if done by the individual on his own. This practice has been followed in the St. Catharines plant whenever possible; from 1905 to 1912 the savings having been sufficient to finance from time to time the construction of over twelve miles of distribution mains and some 2000 new services, the commission deeming it better financial policy not to reduce the rates because they had a surplus revenue for the time being, as our rates are low compared with other cities of our class, but rather to accumulate a reserve for any emergency or such extensions when required, all of such work being charged up to capital account, and increasing the assets on the balance sheet.

The principle is one, however, that has to be governed largely by local conditions of finance, rates, and laws governing the management of such utilities.

MR. A. A. REIMER: The paper presented by Mr. Reed impressed the speaker as being well worthy of study, and he was sorry it had not been presented in time to be printed in the March Proceedings, so that we could have studied it more; such a paper requires considerable thought. Our principal object in speaking at this time is to ask if we cannot have copies of that prepared and sent to those at least who have taken part in the discussion today, so that we can extend our discussions along other lines, if that is practicable.

MR. J. M. DIVEN: Under our present system of publication, the papers after being published are still subject to discussion, the discussion to be printed in a subsequent issue of the JOURNAL. That is one of the advantages of the present system as compared with the old.

MR. A. A. REIMER: The speaker will be glad to study the paper more carefully. The remarks made by Mr. Wills show that other places are using modifications of the general scheme after taking the money from the property owners temporarily. Now we had that plan to some extent, but never pushed it very much. We made a modification, however, that any person wishing an extension in a newly developed property, or a property that was on the map to be developed, would have to guarantee us a certain revenue. We were willing to pay the money for the work and capitalize it, of course, but we wanted to see a guarantee of a certain revenue that would meet a given percentage of the cost before we were willing to go ahead with the work. The result of that has been to prevent a great many wildcat schemes, and today an operator who wants to develop truck land counts his cost before he goes into it instead of having the city pay all the bills.

MR. WILLIAM LUSCOMBE: Will Mr. Reimer be more specific as to what that given percentage is?

MR. A. A. REIMER: In our case we call for 10 per cent of the guaranteed revenue. Then, if the promoter does not build a house along

that main and we get no water revenue, we are sure of at least 10 per cent on the cost. If he does not build any houses, he has to pay us 10 per cent anyhow.

MR. THEODORE A. LEISEN: The speaker has not anything special to say except that it might be interesting to state another instance of how such assessments are made. In Detroit for some years past the policy has been to make extensions wherever buildings are going up, on what is termed a "bonus" plan, the estimated cost of the pipe line being figured out, a bonus of 15 per cent per annum is charged, being supposed to be based on 5 per cent interest on the investment for three years, with the expectation that at the end of three years there will be enough built-up property to make it a paying proposition. The consumer is credited with whatever revenue may be derived from the water supply that is provided for the property at the time the main is laid, and the revenue so credited is deducted from the 15 per cent, the difference being the bonus which he has to pay.

PRESIDENT EARL: Your chairman was very much interested in this paper. Its statement indicating that the New Orleans water rates make no provision for vacant or unimproved property or other interests which are benefited by the water supply, but do not use water to participate in a fair proportion of payment for the benefits which they receive, is in error. The New Orleans rate, and the advocacy of the speaker's paper on water rates, tend very strongly toward a full participation by the taxpayer, as a taxpayer, for all of the benefits which he receives as a taxpayer. This is the very essence of a fair water rate for rate payers, because if any interest which is benefited escapes its fair share of payment, it is inevitable that some other interests or persons must pay an unfairly large proportion to cover the deficit.

There are so many conditions of law under which water works projects have to be financed, that it is a difficult problem to work out a fair distribution of costs and system of reimbursements to cover costs of extension, and also to arrive at a fair division of water rates, and still comply with existing legal restrictions.

Mr. Reed's paper advocates a plan for proportioning the cost of water works extensions, and arranging reimbursements, which appears to be equitable, under those conditions of law governing the financing of extensions which will permit of its adoption. This plan

relieves the water works from carrying unproductive property in extensions until they become reasonably productive, and places the burden of widely scattered extensions in sparsely built areas upon those who are benefited by them until the water consumption reaches a stage where the extension is fully warranted.

These are matters in which your chairman has taken a very deep interest, and which he believes are susceptible of formulation into a general system of financing, both for construction costs and costs of extensions and reimbursements therefor, and also of determining a division between the taxpayers' and the rate payers' fair share of the burden of maintenance and operation, including fixed charges, and finally of fixing the rate as between rate payers, so that all along the line these burdens will be equitably distributed, i.e., to say so that each taxpayer and each rate payer will bear his fair share of cost for each item of service which he receives, paying as a taxpayer for the benefits which accrue to all taxpayers, whether they are water consumers and rate payers or not, and as a rate payer for the benefits which accrue to water consumers only, and paying in proportion to his consumption for the items which vary in cost in proportion to consumption, and in proportion to the size of his service and meter for the items which vary in cost mainly in proportion to said size.

Several papers read before this Association within the last few years, including Mr. Reed's, just presented, contain matter of the greatest value, looking toward the formulation of such a scheme, and your chairman wishes a little later, as a member of the Association, to assist in presenting some further studies in these connections, with the hope that they may be of assistance in reaching something fairer and more uniform in the treatment of these questions than is shown in the widely varying general practice of today, and will be glad if the Association eventually can see its way to the endorsement of some general system of solution of these problems which would tend toward fairness and uniformity therein.

MR. FRANCIS C. HERSEY, JR.: There was a case in Wellesley this last year where a promoter laid out a remote section of the town principally in small bungalow lots for summer homes, etc. You know how these propositions as a rule pan out. For three or four years everything looks prosperous, then perhaps interest dies out and the whole thing goes to pieces. They wanted water and we esti-

mated it would cost us \$3000 to lay a 6-inch main into this property. We got the promoters to give us a surety company's bond for \$3000, guaranteeing that in case in any one of the five years the bond is to run the amount of water used (all metered) did not equal \$600, they would pay us the difference. If at the end of five years the development was a failure we would come out practically even on cost of extensions. If it was a success, we would be ahead.

MR. A. A. REIMER: The speaker takes somewhat the same attitude that the last speaker has expressed and in which others of the speakers seemed to concur, that the promoter has everything to win and nothing to lose. If they go into this game on their own basis we stand to lose, not to gain. Take the last case cited, having served water up to the limit of five years, how much was he in? We have to be very careful, if we adopt any of these plans, to see that we protect our city or our company, in case it is a private company, so that the time will not come when a heavy investment literally sinks into the ground and leaves a hole in our finances. Even if we get rentals for five years, we are out the water anyway.

MR. FRANK C. KIMBALL: It may be of some interest to state that, without laying down a formal rule to be applied in all cases, the Public Utility Commission of New Jersey have recommended in several instances that water and gas utilities make extensions of their piping systems for reasonable distances whenever the owner of the property to be benefited thereby will guarantee a return of 10 cents per foot per year upon all pipe so laid, for a term of five years.

MR. J. M. DIVEN: Most new land developments are more or less of a gamble and to leave the chance element all to the promoters the speaker has used the following method, considering that it is no part of the duty of a water department or company to go into gambling schemes; the promoters are required to pay all cost of pipe extensions into the property, including valves, fire hydrants, services, etc., with an agreement on the part of the department or company that it will refund the cost of the construction and take over the mains and appliances as soon as a certain number of houses have been erected, connected with the mains and commence paying a revenue, or when a certain specified income is received from the extension. Some portion of the capital furnished for the extension may be returned to

the promoters when a less number of houses than the full specified number are built and using water, or when a revenue somewhat less than a full paying one is received, but the contracts generally require the full number of water takers or amount of annual revenue before the mains are taken over and paid for. No interest on the cost is provided for in these contracts, the promoters standing that much as a part of their gamble.

By this method no money is advanced or invested by the water department or company until the development has proven a success and a paying investment for the water works.

MR. D. A. REED: Replying to some of the questions that have been asked; the paper refers more particularly to a municipal plant and still more particularly to the question of the establishing of equitable rates based upon actual cost, not only of the water supplied but the cost of extensions, it being the theory that the extensions should be assessable as nearly as practicable against the abutting property, and that the cost of operating should be borne by the customers using the water.

The question has often come up in our cities, how to make extensions in the streets where the people are not able to advance the money, as was stated by the first speaker. We often find that to be the case even under the present system. Our system embraces the idea that the utility itself should advance the money for extensions out of the depreciation, reserve and sinking funds or any other funds it may have available—temporarily. If money is used to make such extensions the property owners have the privilege of paying all that back into those funds at once if they wish; if not, 8 per cent is assessed yearly against abutting property, the idea being that the 8 per cent will eventually return all the money to those funds. It seems to the speaker unfair to make an extension under a straight guarantee system of either 8 or 10 or any other per cent. When extensions are first put in there are no customers. One extension made last year costing \$9000 had no consumers; there was not a house on the extension. As the consumption increases the total water rates will be deducted from that 8 per cent each year, so that at the time the total revenue exactly equals 8 per cent, the guarantee would be discontinued, and we would be getting only about half that amount because the other half of the 8 per cent would go to operating expense; in fact, in some portions of the system it would

cost much more than the total guarantee to operate, to say nothing of the fixed charges. For that reason this particular feature that the writer attempted to describe embraces the idea of crediting on the guarantee or assessment, by whichever name you call it, sometimes it is called a "guarantee" and it is sometimes called an "assessment," only that portion of the revenues which applies to capital investment. The balance of the water rates not credited to the frontage assessment goes to pay operating expenses as it should. If a man owns a 50-foot lot and his water rate is \$6 a year, one-half or \$3 is credited against the \$4 assessment that is placed against that property, leaving \$1 to be paid in cash. If he is using gas, one-third of his gas rate also is credited, the idea being that the half or one-third of the amount which he pays goes to pay the interest on capital investment of the entire plant. Generally a man's water and gas consumption wipes out his entire assessment. A vacant lot however continues to pay in cash the full assessment until enough consumers have been added to release the entire assessment. We have one section of the city that costs us over fifteen cents per one hundred cubic feet to furnish water. Under the old system of the straight 8 per cent guarantee the department or utility gets its money back when there is nobody using water. Up to the time, or nearly the time, when they were using enough water to retire the guarantee, we were losing money; and when the guarantee was discontinued, we were losing still more money for the reason that we had lost our 8 per cent returns on the investment and were furnishing water at about one-third its actual cost.

The speaker will be very glad indeed to have a full discussion of this subject. It is somewhat different from any system that has come to his notice but seems to have worked itself out automatically.